

SPONGES, HYDROZOA AND POLYZOA OF THE INLE LAKE.

By N. ANNANDALE, D.Sc., F.A.S.B., Director,
Zoological Survey of India.

With Plate XXI.

The Porifera, Hydrozoa and Polyzoa of the Inlé Lake belong without exception to species also found in India proper and only in one instance, that of the cosmopolitan *Ephydatia fluviatilis*, can differences be found even sufficiently great for varietal separation. The most remarkable feature of the fauna so far as these groups are concerned lies in its deficiencies, above all in the apparently complete absence of Phylactolaematus Polyzoa. The three groups, therefore, cast no light on the origin of the fauna and are of less interest than was perhaps anticipated.

PORIFERA.

Only three species of sponges, all of them cosmopolitan as species, are represented in our collection. They are *Spongilla lacustris*, *Spongilla fragilis* and *Ephydatia fluviatilis*, perhaps the three commonest species in the Holarctic Zone. The first two, however, occur as varieties only known from the Oriental Region, while the last differs somewhat both from the *forma typica* and from the Indian race *himalayensis*. I have, therefore, recognized it as a new variety under the name *intha* (i.e., literally, "son of the lake" in Burmese).

Spongilla lacustris var. *proliferens*, Annandale.

1911. *Spongilla proliferens*, Annandale, *Faun. Brit. Ind., Freshw. Sponges, etc.*, p. 72, fig. 9.

1915. *Spongilla lacustris* var. *proliferens*, *id.*, *Mém. Ind. Mus.* V, p. 28.

This sponge was found in abundance in February and March in a pond a few miles east of the town of Yawngwe. Specimens were also taken near the western shore of the Inlé Lake and in rice-fields west of that shore. They agree with specimens from Calcutta and have the characteristic buds well developed. Gemmules were also present in most specimens.

This form of the cosmopolitan *Spongilla lacustris* has been found at many places in the Indo-Gangetic Plain, Peninsular India and Burma.

Spongilla fragilis var. *calcuttana*, Annandale.

(Plate XXI, fig. 1).

1911. Annandale, *op. cit.*, p. 96, fig. 15.

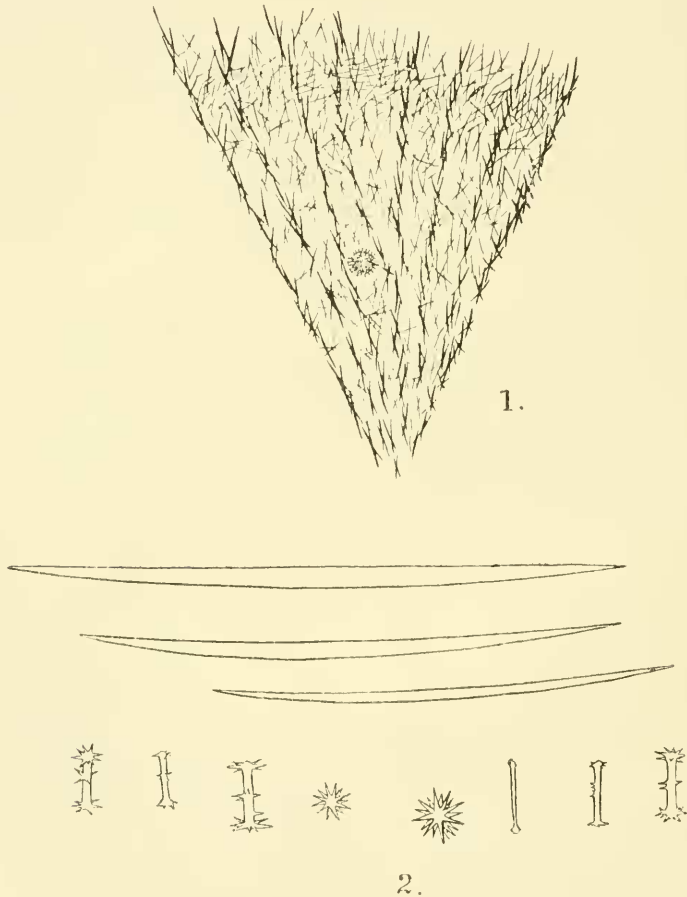
Dried specimens of this sponge were found coating the house-posts of the monastery guest-house at Thalé-u on the eastern side of the lake.

They covered the wood for some inches above the water-level of the time (the end of February) in a uniform layer 3.5 to 4 mm. thick. The variety has been found hitherto only in the Museum tank in Calcutta.

***Ephydatia fluviatilis* var. *intha*, var. nov.**

(Plate XXI, figs. 2, 3).

The sponge forms spherical or irregular masses not more than 5 cm. in diameter attached to lax water-plants such as *Ceratophyllum*, and occasionally flat, somewhat mound-shaped growths on bamboo posts. In each mass there is as a rule a single large circular depression or a



Ephydatia fluviatilis var. *intha*, nov.

FIG. 1.—Part of a transverse section through a small sponge ($\times 8$), showing the regular and well defined radiating spicule-fibres and a single gemmule *in situ*.

FIG. 2.—Spicules. $\times 250$. Several young gemmule-spicules not yet fully developed are shown as well as fully developed spicules of the same order and skeleton-spicules.

group of such depressions into which several wide exhalent channels open. Smaller exhalent channels, however, open directly on the surface. The consistency of the sponges is always very soft, often quite unusually

so. The surface is fairly smooth but minutely hispid. The colour is usually bright green, but sometimes, without apparent cause, the chlorophyl bodies that produce this colour are absent and it is not uncommon for the upper half of a sponge to be green and the lower half yellowish white. Sponges on bamboo posts are brownish yellow.

The skeleton, as might be expected from the softness of the sponge, is very sparse and the number of spicules smaller than usual in the Spongillidae. Slender spicule-fibres can, however, be detected forming an open and fairly even network in the parenchyma. The radiating fibres are more clearly defined than the connecting fibres and can be traced from near the centre of the sponge to the surface. They bifurcate at fairly regular intervals. On the surface they support the epidermal membrane over a fairly extensive subdermal space and project through it as microscopic spines.

There are no "bubble-cells."

The skeleton-spicules are slender and sharply pointed. Though often a little irregular in outline, they never appear, even under the highest powers of the microscope, granular or spiny. Abnormal macroscleres of cruciform or bifid outline are not uncommon.

There are no free macroscleres.

The gemmule-spicules are of the type normal in the species, with shafts considerably longer than a single rotule. They bear few but often very stout and long spines, which project at a right angle. These spines are often arranged in a circle round the middle of the shaft. The rotules are unevenly and deeply denticulate but well-developed and normal.

The gemmules are very small, spherical and of a bright yellow colour. Their pneumatic layer is relatively thin and they are surrounded by a single row of gemmule-spicules. The microphyle is crateriform viewed from outside but contains a small tubule that projects at right angles.

Measurements (in millimetres).

Length of skeleton spicule	...	...	...	0.238—0.357
Diameter of skeleton spicule	...	...	...	0.012
Length of gemmule spicule	...	...	...	0.028—0.032
Diameter of rotule	...	...	...	0.02
Diameter of gemmule	...	...	...	0.6

Type-specimen.—No. P. 36/1. Zoological Survey of India (*Indian Museum*).

The most noteworthy features of this variety are the extreme softness of the sponge, which often collapses in drying into a mere slimy layer, and the regularity of the arrangement of the radiating fibres of the skeleton. The first of these characters, though always well marked, is variable in degree. All the sponges from any one spot as a rule are similar in respect to it, but I was unable to correlate extreme softness with any factor in the environment.

The skeleton-spicules differ from those of the Himalayan form¹ of the species in that they are not at all granular or spiny.

¹ *Ephylatia fluvialilis* sub-sp. *himalayensis*, Annandale, *Rec. Ind. Mus.* VII. p. 138, fig. 1 (1912). See also *Journ. As. Soc., Bengal*, XI, p. 445 (1915).

Habitat.—Intermediate zone of the Inlé Lake and canals of clear water in the neighbourhood.

Sponges were often extremely abundant among thickets of *Ceratophyllum* not far removed from the edge of the lake. None were, however, found in similar thickets in the central region. They appeared to have become more abundant at the beginning of March than they were in February and to have grown considerably in size.

The canals of this sponge shelter quite a little fauna of annelids and insects. No less than three species of the genus *Chaetogaster* (*Oligochaeta*)¹ were found in them, namely *Ch. bengalensis*, Annandale, *Ch. annandalei*, Stephenson, and ? *Ch. limnaei*, Baer, the identity of the last, a common European species, being a little doubtful. All the insects found in the canals were in a larval state. They included at least two species of Chironomidae (Diptera) a *Sisyr*a (Neuroptera) and a Trichopteron. The last lived free without constructing a case to protect itself. The worms were living in young and flourishing sponges, as was the case with the type-specimens of *Ch. annandalei*² in Japan. The original examples of *Ch. bengalensis*³ were, on the other hand, attached to the bodies of molluscs of the genus *Limnaea*, on which also *Ch. limnaei*⁴ has been found both in Europe and in the Kumaon lakes in the Himalayas.

HYDROZOA.

The only Hydrozoon found in the Inlé Lake was *Hydra vulgaris*, Pallas. Numerous specimens were collected from a bamboo house-post in the intermediate zone near Fort Stedman. The post were overgrown with sponges and Polyzoa. The specimens of *Hydra* were moderately small and of a yellowish brown colour. They had five tentacles and not more than two buds. None were sexually mature.

POLYZOA.

The only specimens of Polyzoa of which I was able to find any trace belonged to the Ctenostomatous genus *Hislopia*. The weed-thickets so characteristic of the central region and the intermediate zone seemed to provide ideal quarters for *Fredericella* and certain species of *Plumatella*, but a very careful and prolonged search at a number of places failed to reveal even a single statoblast.

Hislopia lacustris, Carter.

(Plate XXI, fig. 4).

1858. *Hislopia lacustris*, Carter, *Ann. Mag. Nat. Hist.*, III, p. 170, pl. vii, figs. 1—3.

1911. *Hislopia lacustris*, Annandale, *Faun. Brit. Ind., Freshw.-Sponges, etc.*, p. 202.

1917. *Hislopia lacustris*, id., *Mem. As. Soc., Bengal*, VI, pt. 1, p. 34.

Hislopia lacustris occurs in very great abundance in all parts of the Inlé Lake except in foul water in the marginal zone. It grows in uniform

¹ Stephenson, *Rec. Ind. Mus.*, XIV, pp. 9—11 (1918).

² Stephenson, *Mem. As. Soc., Bengal*, VI, p. 88 (1917).

³ Annandale, *Journ. As. Soc., Bengal* (n. s.) I, p. 117 (1905).

⁴ Michaelson, *Mem. Ind. Mus.*, I, p. 113 (1909).

layers of great extent over house-posts and fishing-poles. I figure a young colony just starting to spread over a bamboo. In this condition the zooecia are regular in shape and uniform in size, but as the colony becomes congested many of them are distorted or dwarfed. This is the case to a still greater extent on the shells of Gastropod molluscs (*Hydrobioides nassa*, *H. physcus*, *Taia intha*, *T. elitoralis* and *T. shanensis*), a considerable proportion of which are completely covered by its growth. The four spines at the corner of the aperture are usually well developed and the aperture more or less quadrate. In this respect the colonies from the Inlé Lake are more like those of the specimens figured by Carter in his original description than any I have seen elsewhere.

The species has probably a wide range in northern India and Burma.

***Hislopia malayensis*, Annandale.**

1917. *Hislopia malayensis*, Annandale, *op. cit.*, p. 35, pl. i, fig. 9; pl. ii, figs. 1, 1a.

A single colony of this species, easily recognized by its fan-shaped buds, was found on the stem of a reed in the intermediate zone of the lake near Fort Stedman. I have recently found it growing in abundance on the lower surface of bricks and tiles at the edge of the river Hughli near Calcutta. It was originally described from a small lake at Jalor in the Siamese Malay States.

EXPLANATION OF PLATE XXI.

- FIG. 1.—*Spongilla fragilis* var. *calcuttana*, Annandale. Dried specimen from the Inlé Lake. $\times 1$.
- FIGS. 2, 3.—*Ephydatia fluvialilis* var. *intha*, var. nov. Specimens preserved in alcohol. $\times 1$.
- FIG. 4.—*Hislopia lacustris*, Carter. A young colony on the inner surface of a bamboo house-post. From a specimen preserved in alcohol. $\times 1$.
- FIG. 5.—Protective case of the larva of a *Polypedium* (Chironomid Diptera) covered with the Protozoan *Epistylis flavicans*, Ehr. From a specimen from the Inlé Lake fixed in hot formalin. $\times 10$.

The case of the Dipterous larva is figured to show its resemblance to certain species of Phylactolaematous Polyzoa. When seen living it was mistaken for a colony of this group until a microscopic examination had been made. The larva is described by Mr. Baini Prashad in a separate paper included in this volume.